THE WILD HORSE.[1]

IN the time of Pallas and Pennant, as in the days of Oppian and Pliny, it was commonly believed that true wild horses were to be met with, not only in Central Asia, but also in Europe and Africa. But ere the middle of the nineteenth century was reached, naturalists were beginning to question the existence of genuine wild horses; and somewhat later, the conclusion was arrived at that the horse had long "ceased to exist in a state of nature."[2]

This view had barely been accepted by zoologists when it was announced from St. Petersburg that a true wild horse had at last been discovered in Central Asia by the celebrated Russian traveller, Przewalsky.

An account of this horse was communicated by Poliakoff, in 1881, to the Imperial Russian Geographical Society.[3] The material at Poliakoff's disposal being limited, zoologists were not at once disposed to admit that Przewalsky's horse, as it came to be called, deserved to rank as a distinct species. Some believed the new horse had no more claim for a place amongst wild forms than the mustangs of the western prairies or the brumbies of the Australian bush; while others asserted it was merely a hybrid between the Kiang (*Equus hemionus*) and a Mongolian or other eastern pony.

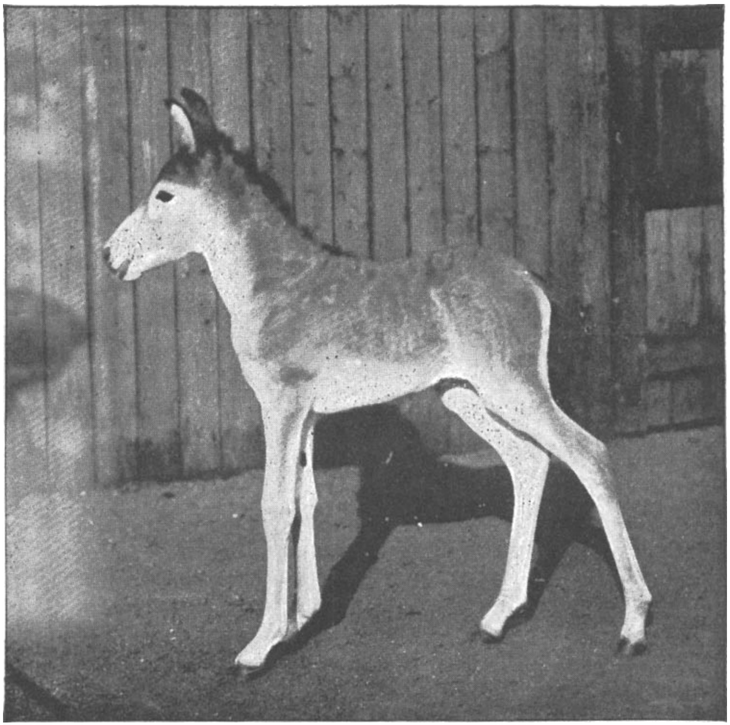
Even after the brothers Grijimailo, in 1890,[4] added somewhat to Poliakoff's original description from material (four skins and a skeleton) brought from the Dzungaria desert, naturalists were still sceptical. The greatest English authority on the structure and classification of the Equidæ during the latter part of the nineteenth century was the late Sir William Flower. Writing in 1891, Flower says:—"Much interest, not yet thoroughly satisfied, has been excited among zoologists" by Poliakoff's announcement, but, he added, "Until more specimens are obtained, it is difficult to form a definite opinion as to the validity of the species, or to resist the suspicion that it may not be an accidental hybrid between the Kiang and the horse."[5]

Since Flower expressed this opinion, quite a number of specimens illustrating the form and structure of Przewalsky's horse at various ages have been added to the St. Petersburg Zoological Museum, and in 1902 Mr. Hagenbeck, of Hamburg (commissioned by His Grace the Duke of Bedford) imported from Mongolia between twenty and thirty living Przewalsky "colts. Though about half of these colts found their way to England, and though Dr. W. Salensky, director of the Zoological Museum of St. Petersburg, published last year an elaborate monograph[6] on Przewalsky's horse, English zoologists are not yet satisfied that we have in this member of the horse family a true and valid species.

So far as I can gather, it is generally believed in England that Przewalsky's horse is a hybrid—a cross between a pony and a Kiang. Beddard, however, admits it may be a distinct type. He says:—"This animal has been believed to be a mule between the wild ass and a feral horse; but if a distinct form—and probability seems to urge that view—it is interesting as breaking down the distinctions between horses and asses."[1]

It must be admitted that in its mane and tail Przewalsky's horse is strongly suggestive of a hybrid, but in the short mane and mule-like tail we may very well have a persistence of ancestral characters—in the wild asses and zebras the mane is always short, and they never have long persistent hairs at the proximal end of the tail.

Though a superficial examination may lead one to think with Flower that Przewalsky's horse is an accidental hybrid, a careful study of the soft parts and skeleton inevitably leads to quite a different conclusion. Though failing to understand why so many zoologists persisted in considering the horse of the Great Gobi Desert to be a mule, I decided to breed a number of Kiang-horse hybrids.[2]



Adderley.

FIG. 1.—Kiang pony Hybrid, *æt.* two days.

With the help of Lord Arthur Cecil, I succeeded early in 1902 in securing a male wild Asiatic ass and a couple of Mongolian pony mares—one a yellow-dun, the other a chestnut. "Jacob," the wild ass, was mated with the dun Mongol mare, with a brownish-yellow Exmoor pony, and with a bay Shetland-Welsh pony. The chestnut Mongol pony was put to a light grey Connemara stallion. Of the four mares referred to, three have already (June) foaled, viz. the Exmoor and the two Mongolian ponies. The Exmoor having foaled first, her hybrid may be first considered.

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[1] The Wild Horse (*Equus przewalskii*, Poliakoff). By Prof. J. C. Ewart, F.R.S. Read before the Royal Society of Edinburgh, June 15.

[2] Bell's "British Quadrupeds."

[3] A translation of Poliakoff's paper will be found in the *Anna's and Magazine of Natural History*, 1881. See also Tegetmeier and Sutherland's "Horses, Asses and Zebras."

[4] See *Proceedings* of the Roy. Geog. Soc., April, 1891.

[5] Flower, "The Horse," pp. 78, 79.

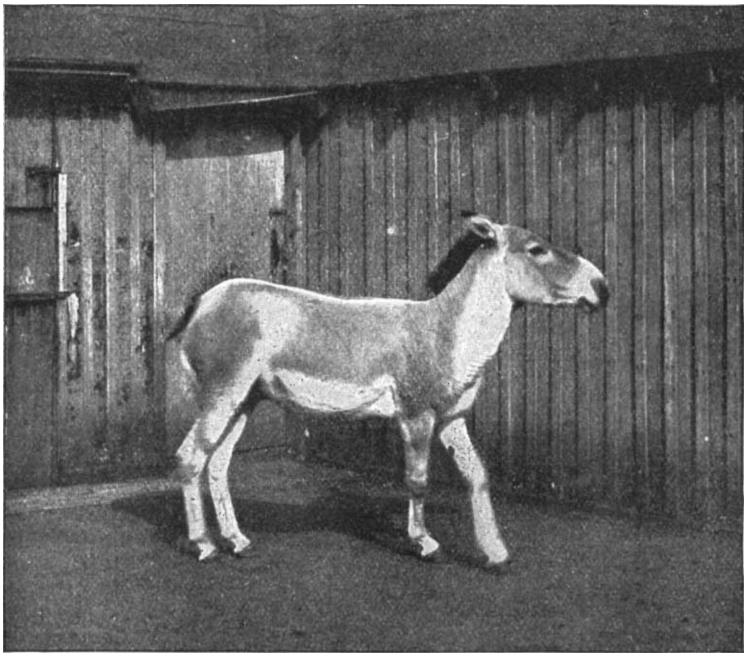
[6] "Wissenschaftliche Resultate der von N. M. Przewalski nach Central Asien." Zool. Theil: Band i., Mammalia; Abth. 2, Ungulata. (St. Petersburg, 1902.)

[1] Beddard, "Mammalia," p. 240. (Macmillan, 1902.)

[2] Sir William Flower, the late president of the London Zoological Society, having more than hinted in 1891 that Przewalsky's horse was a mule, one would have thought an effort would have been made forthwith to test this view in the Society's Garden.

It may be mentioned that the Exmoor pony had, in 1900, and again in 1901, a zebra hybrid, the sire being the Burchell zebra "Matopo," used in my telegony experiments. In the case of her Kiang hybrid the period of gestation was 335 days (one day short of what is regarded as the normal time), but she carried her 1900 zebra hybrid 357 days, three weeks beyond the normal time. The Exmoor-zebra hybrids are as nearly as possible intermediate between a zebra and a pony; the Kiang hybrid, on the other hand, might almost pass for a pure-bred wild ass.[1] In zebra hybrids the ground colour has invariably been darker than in the zebra parent; but the Kiang hybrid is decidedly lighter in colour than her wild sire, while in make she strongly suggests an Onager—the wild ass so often associated with the Runn of Cutch. Alike in make and colour, the Kiang hybrid differs from a young Przewalsky foal.[2]

I have never seen a new-born wild horse, but if one may judge from the conformation of the hocks, from the coarse legs, big joints, and large heads of the yearlings—from their close resemblance to dwarf cart-horse foals—it may be assumed they are neither characterised by unusual agility nor fleetness. The Kiang hybrid, on the other hand, looks as if built for speed, and almost from the moment of its birth it has, by its energy and vivacity, been a source of considerable anxiety to its by no means placid Exmoor dam. When four days old it walked more than twenty miles; on the fifth day, instead of resting, it was unusually active, as if anxious to make up for the forced idleness of the previous evening. In the hybrid the joints are small, and the legs are long and slender and covered with short close-lying hair. In the wild horse the joints are large, and the "bone" is round as in heavy horses.



E. Darwin-Wilmot.

FIG. 2.—Sire of Hybrid.

As to its colour, it may be especially mentioned that the hybrid has more white around the eyes than the wild horse, but is of a darker tint along the back and sides and over the hind quarters. Too much importance, however, should not be attached to differences in colour, for, though the two hybrid foals which have already arrived closely agree in their coloration, subsequent foals may differ considerably, and it is well known that young wild horses from the western portions of the Great Altai Mountains differ in tint from those found further east.

Of more importance than the coat-colour is the nature of the hair. A Przewalsky foal has a woolly coat not unlike that of an Iceland foal. In the hybrid, the hair is short and fine, and only slightly wavy over the hind quarters. It thus differs but little from a thoroughbred or Arab foal.

The mane and tail of the hybrid are exactly what one would expect in a mule; the dorsal band, 75mm. wide over the croup in the sire, has in the hybrid a nearly uniform width of 12mm. from its origin at the withers until it loses itself half-way down the tail. The tail, which differs but little from that of a pony foal, is of a lighter brown colour than the short upright mane, while the dorsal band is of a reddish-brown hue. In the wild horse the dorsal band is sometimes very narrow (under 5mm.) and indistinct. In the Kiang sire there are pale but quite distinct stripes above and below the hocks, and small faint spots over the hind quarters—vestiges, apparently, of ancestral markings; but in the hybrid there are neither indications of stripes across the hocks or withers, nor spots on the quarters.[1]

In having no indications of bars on the legs or faint stripes across the shoulders, the hybrid differs from Przewalsky colts; it also differs in having a longer flank feather, and in the facial whorl being well below the level of the eyes. As in the Kiang and wild horse, the under surface of the body and the inner aspect of the limbs are nearly white.

In the hybrid the front chestnuts (wrist callosities) are smooth and just above the level of the skin, but instead of being roughly pear-shaped as in the Kiang, they are somewhat shield-shaped, as in the Onager. In the wild horse the front chestnuts are elongated.

In the Exmoor dam the hind chestnuts (hock callosities) are 27mm. in length and 10mm. wide. In the sire there is a minute callosity inside the right hock. In the hybrid the hind chestnuts are completely absent. In the absence of hock callosities the hybrid differs from the wild horse, in which they are relatively longer than in Clydesdales, Shires, and other heavy breeds of horses. In the hybrid, as in the sire and dam, there are smooth, rounded fetlock callosities (ergots) on both fore and hind limbs.

In the wild horse the hoof is highly specialised, the "heels" being bent inwards (contracted) to take a vice-like grip of the frog. In the hybrid the hoof closely resembles that of the pony dam; it is shorter than in the Kiang, and less contracted at the "heels" than in the wild horse.

The Kiang hybrid further differs from a young wild horse in the lips and muzzle, the nostrils and ears, and in the form of the head.

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[1] The wild parent is generally prepotent over the tame—in Mendelian terms the Kiang proved dominant, the Exmoor pony recessive.

[2] For a skin of a very young Przewalsky foal I am indebted to Mr. Carl Hagenbeck, of Hamburg.

[1] The complete absence of stripes in the Kiang hybrid is all the more interesting, seeing that the dam's previous foals were zebra hybrids. Evidently the Kiang hybrid lends no support to the telegony doctrine.

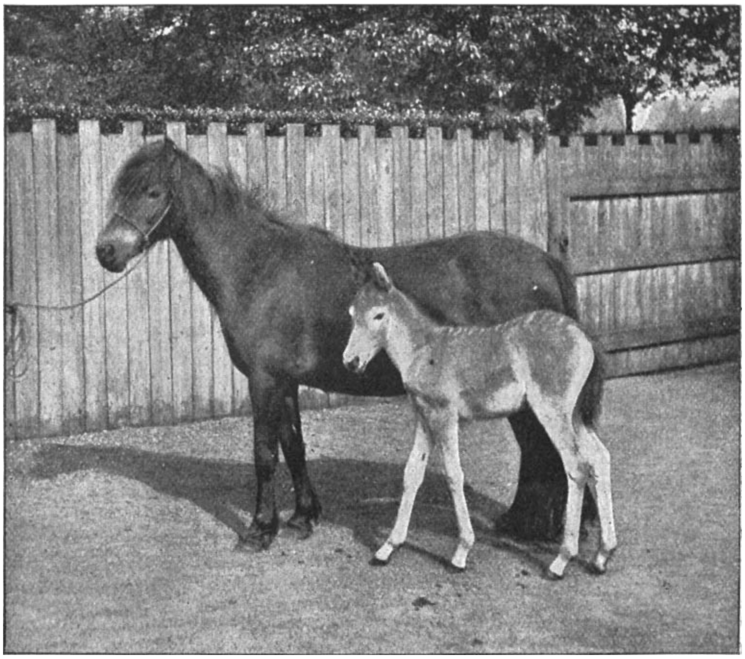
The wild horse has a coarse, heavy head, with the lower lip (as is often the case in large-headed horses and in Arabs with large hock callosities) projecting beyond the upper. The nostrils in their outline resemble those of the domestic horse, while the long pointed ears generally project obliquely outwards, as in many heavy horses and in the Melbourne strain of thoroughbreds. Further, in the wild horse the forehead is convex from above downwards, as well as from side to side—hence Przewalsky's horse is sometimes said to be ram-headed. In the hybrid the muzzle is fine as in Arabs, the lower lip is decidedly shorter than the prominent upper lip, the nostrils are narrow as in the Kiang, and even at birth the forehead was less rounded than is commonly the case in ordinary foals. The ears of the hybrid, though relatively shorter and narrower than in the Kiang, have, as in the Kiang, incurved dark-tinted tips, and they are usually carried erect or slightly inclined towards the middle line. In the wild horse the croup is nearly straight, and the tail is set on high up, as in many desert Arabs. In the hybrid the croup slopes as in the Kiang and in many ponies, with the result that the root of the tail is on a decidedly lower level than the highest part of the hind quarters. Further, in the young wild horses I have seen the heels (points of the hocks) almost touch each other, as in many Clydesdales, and the hocks are distinctly bent. In the hybrid the hocks are as straight as in well-bred foals, and the heels are kept well apart in walking.

Another difference of considerable importance is that while the wild horse neighs, the hybrid makes a peculiar barking sound, remotely suggestive of the rasping call of the Kiang.

The dun Mongol pony's hybrid arrived five weeks before its time, and, though perfect in every way, was short-lived. Only in one respect did this hybrid differ from the one already described. In the Exmoor hybrid the hock callosities are entirely absent; in the Mongol hybrid the right hock callosity is completely wanting, but the left one is represented by a small, slightly hardened patch of skin sparsely covered with short white hair.[1] In zebra hybrids out of cross-bred mares the hock callosities are usually fairly large, while in hybrids out of well-bred ("Celtic") pony mares the hock callosities are invariably absent. The Exmoor pony, though not so pure as the Hebridean and other ponies without callosities, has undoubtedly a strong dash of true pony blood; the Mongol pony is as certainly saturated with what, for want of a better term, may be called cart-horse blood. As I expected, there were no hock callosities present in the Exmoor hybrid. In the Mongol hybrid there was less evidence of hock callosities than I expected.

From what has been said it follows that a Kiang-horse hybrid differs from Przewalsky's horse (1) in having at the most the merest vestiges of hock callosities; (2) in not neighing like a horse; (3) in having finer limbs and joints and less specialised hoofs; (4) in the form of the head, in the lips, muzzle, and ears; (5) in the dorsal band; and (6) in the absence, even at birth, of any suggestion of shoulder-stripes and of bars on the legs.

While most of the zoologists who hesitated to regard Przewalsky's horse as representing a distinct and primitive type favoured the view that it was a mule, some asserted that it in no way essentially differed from an ordinary horse. The colts brought from Central Asia, they said, were the offspring of escaped Mongol ponies. Others affirmed that they failed to discover any difference between the young wild horses in the London Zoological Gardens and Iceland ponies of a like age. To test the first of these assertions, I, as already mentioned, mated the chestnut Mongol pony with a young Connemara stallion; to test the second, I purchased last autumn a recently-imported yellow-dun Iceland mare in foal to an Iceland stallion. As I anticipated, the chestnut Mongol mare produced a foal the image of herself. This foal, it is hardly necessary to say, decidedly differs from the Przewalsky colts recently imported from Central Asia by Mr. Hagenbeck, and it as decidedly differs from the Kiang hybrids described above.



E. Darwin-Wilmot.

FIG. 3.—Exmoor pony and her Hybrid foal, *æt.* 9 days.

The Iceland foal, notwithstanding the upright mane and the woolly coat, for a time of a nearly uniform white colour, could never be mistaken for a wild horse, and the older it gets the differences will become accentuated.

If Przewalsky's horse is neither a Kiang-pony mule nor a feral Mongolian pony, and if, moreover, it is fertile (and its fertility can hardly be questioned), I fail to see how we can escape from the conclusion that it is as deserving as, say, the Kiang to be regarded as a distinct species. Granting Przewalsky's horse is a true wild horse, the question arises: In what way, if any, is it related to our domestic horses? It is still too soon to answer this question; but I venture to think that should we, by and by, arrive at the conclusion that our domestic horses have had a multiple origin—have sprung from at least two perfectly distinct sources—we shall probably subsequently come to the further conclusion that our big-headed, big-jointed horses, with well-marked chestnuts on the hind legs, are more intimately related to the wild horse than the small-headed, slender-limbed varieties without chestnuts on the hind legs; that, in fact, the heavy horses, whether found in Europe, Asia, or Africa, and Przewalsky's horse have sprung from the same ancestors.

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[1] The presence of hair in the imperfectly-formed hock callosity of the Mongol hybrid, together with the presence of hair rudiments in the developing hock callosity of the common horse, certainly lends very little support to the view held by some zoologists that the chestnuts of the horse are vestiges of glands.

HIGHER TECHNICAL EDUCATION IN GREAT BRITAIN AND GERMANY.[1]

H.M. Consul at Stuttgart, Dr. Frederick Rose, has rendered excellent service to the cause of technical education by the admirable reports which he has from time to time sent to the Foreign Office; but no previous report of his presents such a clear view of the extent of the provisions for technical education in Germany and of the nature of the services which the technical high schools render to the nation as does the one recently published by the Foreign Office.

Dr. Rose is not a mere blind enthusiast for education, unable to see the other factors which have made for the commercial progress of Germany. On the contrary, he gives due weight to the system of protection, the orderly habits inculcated by the universal system of military service, and other matters which contribute in this direction; but after doing this he is still compelled to recognise the great part played by the German technical high schools in the industrial development of the nation.

The object of this article is to compare the condition of technical education in the United Kingdom with the condition in the country with which Dr. Rose deals; unfortunately, the comparison is one calculated to give Englishmen little satisfaction.

In this country we have a fairly large number of technical institutions with many thousands of students; indeed, in numbers only, it is probable that we should compare not unfavourably with our German cousins. But when we look more closely into the statistics we find that in most of these institutions the majority of the students are attending evening classes only, and that of this majority a very large number are engaged in work of an exceedingly elementary character. If one considers the day students and restricts oneself to those who are above the very low minimum age of fifteen, it is found that, counting not merely the technical institutions, but also the universities and university colleges, the total number of day students for the United Kingdom amounted in 1901 to less than 4000. The corresponding total for the German Empire was, in 1902, nearly 15,000.

These figures, as they stand, are sufficient to show how very backward we are in this country in the matter of higher technical education; but, when we bring into the comparison the ages and previous education of the students of the two countries, we see that the above figures by no means adequately show how far we are behind the foreigner in the matter of training. For it must be remembered that, with very few exceptions, all students in German technical high schools commence their studies when they are not less than eighteen years of age, and after passing with credit a nine years' course of instruction in secondary schools. We may estimate that of the 4000 students over fifteen in institutions in the United Kingdom providing technical education in the daytime, at least 1400—probably considerably more—were under eighteen; this reduces us to 2600 students to compare with the 15,000 of Germany.

Nor is this all; for, while the majority of the German students pursue their course of study for at least three years, and in many cases for four, in this country only a very small proportion proceed beyond two years; thus it was found that in 1901 there were about 400 third or fourth year students taking complete day courses in engineering in the *whole United Kingdom*; at the same time there were in the Berlin Technical High School *alone* more third and fourth year students of engineering than in all the universities and colleges of the United Kingdom put together; moreover, none of these German students were under twenty, while our figures could only be obtained by counting every student of this standing over seventeen.

To what must we attribute our great inferiority in this respect? In the first place to the condition of secondary education in this country; secondly, to the fact that German and American manufacturers believe in technical education, while many of their competitors in this country are still blind to its advantages; and thirdly to the fact that, while our Government contributes with liberality to elementary education, it is exceedingly parsimonious in its dealings with higher education.

First, then, let us look at the question of secondary education. Dr. Rose's report gives an adequate idea of the splendid character of the preliminary training which young Germans receive before they enter the technical high schools or other higher institutions in Germany. The secondary schools to which he refers are accessible to children of intelligence all over the Empire; they are carefully graded so as to overlap one another as little as possible, and every inducement is given to parents to allow their children to pursue a complete course of study. The leaving certificates of these schools confer upon children the right of entry to the universities and technical high schools, while they also form a starting point for those who wish to enter the more important branches of the State service, and confer the right to escape part of the compulsory military training. We may hope that in this country the new education authorities will improve our secondary education. Is it too much to expect that the Government may issue a leaving certificate conferring similar privileges to the German one, and taking the place of the medley of university local, Board of Education, Army, Navy, and Civil Service examinations, and many others, which now hang like mill-stones round the necks of the teachers in secondary schools.

The problem how to make British manufacturers believe in technical education is one which is slowly solving itself, and within the recollection of the present writer an improvement in this direction has taken place. That the improvement has not been more rapid is partly due to the fact that in this country the imperfectly trained student has been over-confident in his own powers to an extent only explicable by considering the shortness and imperfection of his training. The half-educated, college-trained youth has thus often become a laughing-stock in the shops; he has given his opinions freely, and they have not infrequently been wrong.

In some of the best technical institutions we are altering all this; our students are made to understand that the preliminary training they receive is only a preliminary training, enabling them to acquire more complete knowledge later, but not entitling them to

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[1] "Report on the German Technical High Schools." By Dr F. Rose, H.M. Consul, Stuttgart. (No. 591, Miscellaneous Series of Diplomatic and Consular Reports.)

Since this article was written, Lord Rosebery's letter has appeared, foreshadowing the establishment of a technical high school approximately on the Berlin scale in London. But the writer lets the article stand; for one such institution will scarcely suffice for the ultimate needs of the metropolis alone. It may be hoped, however, that similar developments will occur in our other great centres of population.